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A survey of digital reading practices among librarians and Information science students in Denmark

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Abstract:
This article reports key findings from a quantitative online survey of everyday reading practices (*N* = 277) that targeted library professionals and students enrolled in an Information Science program in Denmark. The survey derived its rationale from the current upsurge in reading on smartphones but was constructed so as to give a comprehensive overview of all devices used for reading, as well as to map how these devices combine in respondents' reading behaviour with specific text genres and physical environments. The data documents a highly diversified reading ecology where most genres are read on most devices and where readers' choices and preferences vary with gender, age, and life situation. The clearest patterns emerge among female respondents (*N* = 221; M_{age} = 39; range 19-65) who fall into distinct reader/user groups according to age. Most importantly, we found the variety of digital devices used for reading to increase rather than decrease

with age, contrary to common assumptions. Meanwhile, the youngest of the female respondents seem to read in the greatest variety of environments, and to make the least use of printed reading materials.

Introduction

The use of phones for various kinds of reading is growing proportionally with the increased popularity of smartphones and the ubiquitous infrastructure combined with the development of new digital formats and genres. Reading on smartphones influences not only how we read, but also where we read. Reading on the go is not new; reading the printed book has been used for entertainment during transportation for decades (Marshall, 2010). Nonetheless, it seems that the future of digital reading, also of longer literary texts, is on the smartphone, rather than on the dedicated e-reader. Pew surveys report that a growing number of Americans read on the smartphone (Mitchell, Stocking & Matsa, 2016). This emergent behaviour includes the reading of longer news articles (ibid.) and also e-books, which were read on smartphones by 13% of Americans in 2016 as compared to just 5% in 2011 (Perrin, 2016, p. 6). One reason phone reading is rising is of course the increased ownership of smartphones. In 2015, 64% of Americans owned a smartphone (Pew Research Center, 2015). The number is even higher in Denmark, where 84% of the population owned a smartphone in 2017 (Danish Agency for Culture and Palaces, 2018).

With the digitization of texts and the growing use of new digital devices, one would assume that new reading patterns would emerge and as a result thereof, that new readers would emerge. Sociological studies of reading habits and behaviour have a long tradition, which shows almost the same between-reader differences across countries in the Western cultural sphere. Women tend to read more than men; women read fiction while men read non-fiction; the well-educated read more than the less-educated; the older read more than teens; and teen girls read more than teen boys (e.g. Ross, McKechnie and Rothbauer, 2006; Hansson, 1989; Booktrust, 2013; Böseverein des Deutsches Buchhandels, 2016). Even though this picture proves oversimplified upon closer examination (Ross, McKechnie and Rothbauer, 2018), surveys from different countries show close correlations between level of education, level of income and cultural participation. The more educated people are, and the higher income they have, the more they participate in cultural activities, and the more they read (Bennett et al., 2009; Eurostat, 2016).

Teens and young adults who grew up with mobile phones and the internet are generally reported to have an intuitive and comfortable relation to new media (Palfrey and Gasser, 2008; Magsamen-Conrad et al., 2015). Their social life and communication with peers is to a large degree intertwined with the digital world. In Denmark and many other countries the learning environments in schools are also strongly supported with different types of online learning platforms (e.g. Schilhab, 2017a). These trends have led to the introduction of generational labels such as ‘digital youth,’ ‘digital natives,’ ‘the app generation,’ or ‘networked publics’ (Gardner and Davis, 2014; Jenkins, 2009; boyd, 2014;

Juncker and Balling, 2015). Research shows that young adults embrace digital media as a means of communication and artistic creation, but also for identity formation. This is evident in media surveys where younger age groups are among the most eager users of new technology. Especially when it comes to entertainment, e.g., activities in relation to gaming or streaming TV, younger age groups are heavy users of internet-based digital services (Eurostat 2016; The Danish Agency for Culture and Palaces, 2018b).

When it comes to digital reading, this pattern is repeated. A Pew study from 2011 shows that Americans under 40 read more e-books than older groups. It also shows that young e-book readers under 30 are more likely to read their e-books on mobile phones or laptops (Zickuhr et al., 2012). Still, newer surveys show that print books remain much more popular than books in digital formats, even among young adults (Perrin, 2016). In Denmark the reading of e-books is rising, albeit very slowly (Balling et al., 2014). One of the first studies on the subject showed that most readers of e-books were to be found among younger male readers (Hjarvard and Helles, 2013). This was confirmed in a recent national survey (Book and Literature Panel, 2017) where age emerged as the decisive factor. In this survey, 80% of Denmark's inhabitants over 70 reported to never have read an e-book whereas the number dropped to 45% for 15-19-year olds (ibid., Figure 74). So even though the reading of paper books hasn't been completely eliminated by e-books, it seems that younger age groups have developed more differentiated reading patterns where they read both e-books and print books and on a variety of platforms.

We will report results from an online survey of everyday reading on smartphones and other devices, conducted among library professionals and Information Science students in Denmark. We chose these populations because Danish public libraries are strongly involved with expanding the use of e-books. They run a common e-book lending website called eReolen (the e-Bookcase) and are engaged in experiments with digital literature. The Information Science program at the University of Copenhagen has for several years been focused on digital media and digital culture, and has offered courses on e-books and digital reading. Our assumption was that library professionals and Information Science students in Denmark would be familiar with e-books and digital reading and have overall positive attitudes towards mobile reading.

Our study sought to capture emergent reading behaviours in general, but we also had a particular interest in finding out to what extent the smartphone was used for reading longer literary texts, and to what extent the mobility of the smartphone caused changes in relation to where people read.

Digital reading: materiality, dissonance, locations

When people move from reading on paper to reading on screen, they also change the way in which they handle the reading device. How is one's reading affected by the shiny cool surface, the backlight, or the fact that all texts regardless of genre or length have the same weight and format when reading on a smartphone? How do the new affordances and mobility of the reading device influence one's reading habits and attitudes towards reading?

In this section we will review some of the previous literature on differences between reading on screen and reading on paper that informed the rationale of our study. We will focus on reader's perspective features, such as aspects of materiality and affordance, dissonance, distraction and affection, and on extant knowledge related to reading location.

Materiality and affordance

Once we consider the physical appearance of digital reading devices it becomes clear with new urgency that reading is not solely a cognitive and intellectual activity, but also an ergonomic and embodied action, which involves haptic and sensory-motor processes (Mangen and Schilhab, 2012; Mangen, 2013). The sensory-motor interaction with the reading device influences how we handle the text and how we use our hands. When reading a paper book we turn the pages, we feel the weight of the book, we experience that the volume of pages on the left side increases as we read along. Reading on a tablet, for instance, is an altogether different sensory-motor experience as we feel a smooth surface under our fingertips when we swipe pages, and as the device prevents us from experiencing the weight of the pages that we have read (Schilhab, Balling, and Kuzmičová, 2018).

Furthermore, the physical text and the digital text are characterised by different types of materiality. Issues in digitalisation have in recent years fuelled new discussions and conceptualisations of the term materiality (Leonardi, 2010, 2012). Materiality has traditionally been linked to physical objects that are tangible. Software and digital artefacts are not objects, and have a new form of physicality open mainly to sight and indirect manipulation (Schilhab, 2017b). They cannot be touched upon, but are nevertheless there, and have consequences for our lives. Thus the concept of materiality in relation to technologies does not refer to the materials out of which they are made. Rather it points at 'constituent features' (Leonardi, 2012, p. 6) and what they allow people to do. The distinctive physical elements of paper books (weight, smell, structure) are for many readers an important part of the reading experience (Baron, 2015), and perhaps especially so in fiction reading where pleasure is a key prerequisite and motivation for sustained reading activity (Burke and Bon, 2018). The materiality of the digital text is rather linked with the technology and what it allows people to do. So even if the text is not materialized in a tangible form, the technology allows us to read it. The technology also allows us to interact with the text in new ways due to its unique affordances of the digital device, that is, built-in possibilities but also constraints for human action (Gibson, 1996; Hutchby, 2001). The digital device allows, for example, carrying many books at the same time, it allows customizing, reading and swiping between pages with one hand, and shifting between text and audio editions of a book.

Dissonance, distraction and affection

The question is to what extent the different affordances of print and digital texts influence actual reading. How are print reading and digital reading experienced differently by

readers? Is the reported preference for the physical features of print books merely a matter of habit developed through a lifetime spent reading print books, or do we experience another form of reading altogether in relation to digital devices? Studies show that some readers experience 'haptic dissonance' when confronted with a digital reading device. In a qualitative study conducted by Gerlach & Buxmann (2011) among heavy readers (minimum 10 books/year), the informants reported a distance and a reluctance to accept the device due to its surface and affordance. Haptic dissonance is described as 'the perceived unpleasantness an individual experiences because using an object *feels* physically different from other cognitions [sic] held by the individual' (p. 4). The informants, who were between 14-60 of age, reported missing especially the feeling of paper while turning the page (56,7%) and felt holding an e-reader as 'awkward' (26,7%) (Gerlach & Buxmann, 2011, Table 3) .

Another issue of relevance for the present study is the question of distraction. When studying digital reading we need to take into consideration that some of the most common reading devices are multimedia multifunctional computers. Our laptops, tablets or smartphones hold potentially all our communication and interactions with friends and work, our banking business, our entertainment channels (gaming, music, television), our food recipes, holiday plans and tickets, and our self-monitoring fitness data. When we read a paper book, we hold an object that has a singular purpose, i.e., to be read. While we read we may experience the distraction from all manners of notifications or be tempted to click on other sites or apps. This is exactly why many point at the paper book as more suitable for contemplation and so-called deep reading (Birkerts, 1994; Hayles, 2007; Baron, 2015; Mackey, 2011; Socken, 2013).

Moreover, research on emotions and smartphones, specifically, reports that users commonly experience stress induced by applications and text messages on the one hand, and a fear of losing the phone or running out of battery on the other (Serrano-Puche, 2015). In this case, it is not the handling of the device that causes negative feelings, but rather the anxiety related to online overload and the complementary 'fear of missing out'. On the other hand, due to the phone's constant presence in our pocket and the possibility to customize it (covers, ringtones, wallpapers, app selection), mobile phones often become an icon of the self for the user (Vincent, 2006). Vincent (2005, 2006, 2013) explains that people's emotional attachment to their phones is not necessarily connected to the device per se, but rather to the relationships and information mediated by the device. In the specific case of female users, research has shown a variety of positive feelings associated with the mobile phone. In a study carried out among women in Italy, France, UK, Spain and Germany in 2009 (N = 7255) and reported by Fortunati and Taipale (2012), feelings such as interest, joy/pleasure, excitement and relaxation were the most frequently reported.

The question is to what degree the arguments against digital reading have universal validity and to what degree this varies with individual habits and living conditions. Since the early days of digital reading research, there has been evidence of certain individuals and groups showing greater openness and affinity to digital reading, often in connection with specific genres and/or situations (Marshall and Ruotolo, 2002; Miranda et al., 2011; Tveit

and Mangen, 2014; Kobo, 2016; Clowes, 2018; Kuzmičová et al,. 2018a). The evidence goes beyond any simplified 'digital natives' vs. 'digital immigrants' narrative (Prensky, 2001; Palfrey and Gasser, 2008) insofar as it points to factors distinct from age and possibly even previous exposure to digital technologies. For instance, Miranda et al. (2011) and Tveit and Mangen (2014) found that digital reading devices have a special appeal for young male students with problematic attitudes to reading, and can be used to promote reading within this group. Other groups that have been proposed to benefit from the distinctive affordances of mobile digital reading are those who may struggle to fit in dedicated reading sessions in their otherwise hectic lives, such as parents of young children or professionals who work long hours (Hupfeld et al., 2013; Kuzmičová et al., 2018b). Mobile-based reading promotion programmes implemented by NGOs around the world are also increasingly serving low literacy families and geographic areas where print books are sparse or unavailable (e.g. UNESCO, 2014; Stiftung Lesen, 2017).

Reading location

Reading is a spatially situated activity. We read at our desk, in the living room in our favorite chair or on the bus during transportation. With the increased use of mobile devices for reading, the question of location has gained new relevance. Where do we read and does it matter where we read? Our physical reading environment is much more than a potential source of distraction; it can scaffold our mental imagery and understanding of a text by offering congruent perceptual stimuli (e.g. when reading about the natural world in an outdoor location) (e.g. Schilhab, 2018), and it can boost or spoil the aesthetic pleasure we take in any given text (Kuzmičová 2016). Readers tend to have relatively strong opinions as to where they prefer to read when given a choice.

According to a recent survey into the fiction reading habits of Dutch undergraduates (Burke and Bon, 2018), traditional reading locations such as the bed or living room couch are still much preferred, despite the current upsurge of mobile reading practices. However, exploratory research into the reading behaviours of students across multiple countries (Kuzmičová et al., 2018a) has shown that location preferences tend to be intricately diversified according to text type (e.g. narrative vs. expository) and purpose of reading (e.g. study vs. leisure). For instance, few choose to lie down when reading for learning purposes. Kuzmičová et al.'s (2018a) study also points at the salience of immediate social space in readers' environment selections, that is, participants' sensitivity to the presence and concurrent activity of other people in the places where they read. Importantly, this sensitivity is not defined in the simple negative. Participants in the study did not consistently prefer or require solitude and privacy for reading but rather expressed a preference for having a social surrounding to blend with while reading. Meanwhile, reading in public as opposed to familiar social spaces also emerged as a factor in substrate selection, as digital devices were in some cases expressly appreciated for their ability to conceal one's reading materials (see also Hupfeld et al., 2013). These findings contradict accepted stereotypes of continuous silent reading as an activity unequivocally enhanced by seclusion (e.g. Birkerts,

1994), but also as an activity necessitating mental detachment from the immediate environment (see also Kuzmičová, 2016).

Research questions

Based on the presented knowledge on reading habits and behaviours connected to the use of new media, we identified the following hypotheses related to reading on smartphones: Firstly, we assumed that younger readers were more likely to read on screens than older readers. Secondly, we expected that longer texts were more likely to be read on paper and laptop or desktop computers than on smaller screens. Thirdly, we thought it likely that parents of young children, who have less time or freedom to choose how and where they read, will be more open to adopting the phone also for long-form genres, including novels. More generally, the survey was constructed to primarily answer the following research questions:

- What do people read on smartphones vs. other devices (genre questions) and where do they do it (environment questions)?
- Who uses smartphones most extensively for reading, and for the reading of long-form text in particular (socio-demographic questions)?
- Are fiction reading patterns distinctive relative to other genres, and how (genre vs. device questions)?

Of the 277 participants who responded to the survey, only 55 were men. Therefore, in the analyses presented below, we will first point at the most robust gender differences but will then look more closely at differences among our female respondents in relation to age, occupation, and, indirectly, also to family status.

Methodology

We conducted an online survey in SurveyXact, a tool for creating questionnaire-based surveys (www.surveyxact.com), and distributed it to both undergraduate and graduate students in the Department of Information Studies at the University of Copenhagen, as well as to library professionals working in public libraries across Denmark. Colleagues recruited the students through the department's intranet and through verbal calls to the students. The library professionals were recruited through contact to leaders at all central public libraries in Denmark with a request to distribute the link to all employees. The data was collected in November–December 2016.

The survey questionnaire (**Appendix 1**) consisted of 50 questions covering 7 different themes: the overall use of smartphone (Items 1–6), the use of digital technologies beyond the smartphone (Items 7–10); reading of different genres on the smartphone and other devices, and also including print (Items 11–17); the use of different reading technologies in different everyday situations/locations (Items 18–30); subjective user experience/affordance perception when reading on the smartphone (e.g. the perceived

importance of availability, backlight) (Item 31); the use of syncing software and other reading apps (Items 32–34); the number of books read in the preceding twelve months (e-books/print) (Items 35–37); and demographic questions (age, education, young children, residence, gender) (Items 38–50).

Sample

738 respondents accessed and returned the survey. 268 of the returned forms were blank and thus excluded from analysis. The opening two questions asked if the respondent *never* used their phone for reading (*N* = 85) and if they owned a phone where reading was restricted to SMS (*N* = 17). The respondents who answered positively to these two questions were excluded. Of the remaining 368 respondents, 91 did not complete the full survey and were also excluded. This left a sample of 277 respondents who answered all the questions. 55 of these respondents were male and 221 were female, and one respondent chose not to disclose their gender. The mean age was 39 years (*SD* = 12; range 19-65). 70 respondents were students and 206 stated that their main occupation was work. Among the students, there were 17 males and 53 females, with a mean age of 28 (*SD* = 7; range 19-52). Among the library professionals, there were 38 males and 168 females, mean age 43 (*SD* = 11; range 25-65).

The final sample of male respondents was relatively small. Therefore, after an initial outlook on the different uses of smartphones (Figure 1), followed by a discussion of between-gender differences in the frequency of use of different devices (Appendix 2, Table 1-5), our analyses below will gradually focus on patterns in the female sample alone. Specifically, we will focus on the female respondents' self-reported reading behaviours with respect to how devices combine with genres and environments. Still, when we talk about 'female readers' in the following analysis, we need to emphasize that our sample is not about average readers, but consists of well educated women trained in book and reading related professions.

Because of the sample size and nature of the data (ordinal scaled items), differences between groups were analysed using non-parametric methods such as the Kruskal-Wallis Test between multiple groups and Mann-Whitney-U Tests for comparisons between pairs of groups (see also Appendix 2). These procedures entail computing how reasonable it is to consider two (or more) populations as the same in some respect in a so-called significance test, where the null hypothesis is that the population medians are equal.

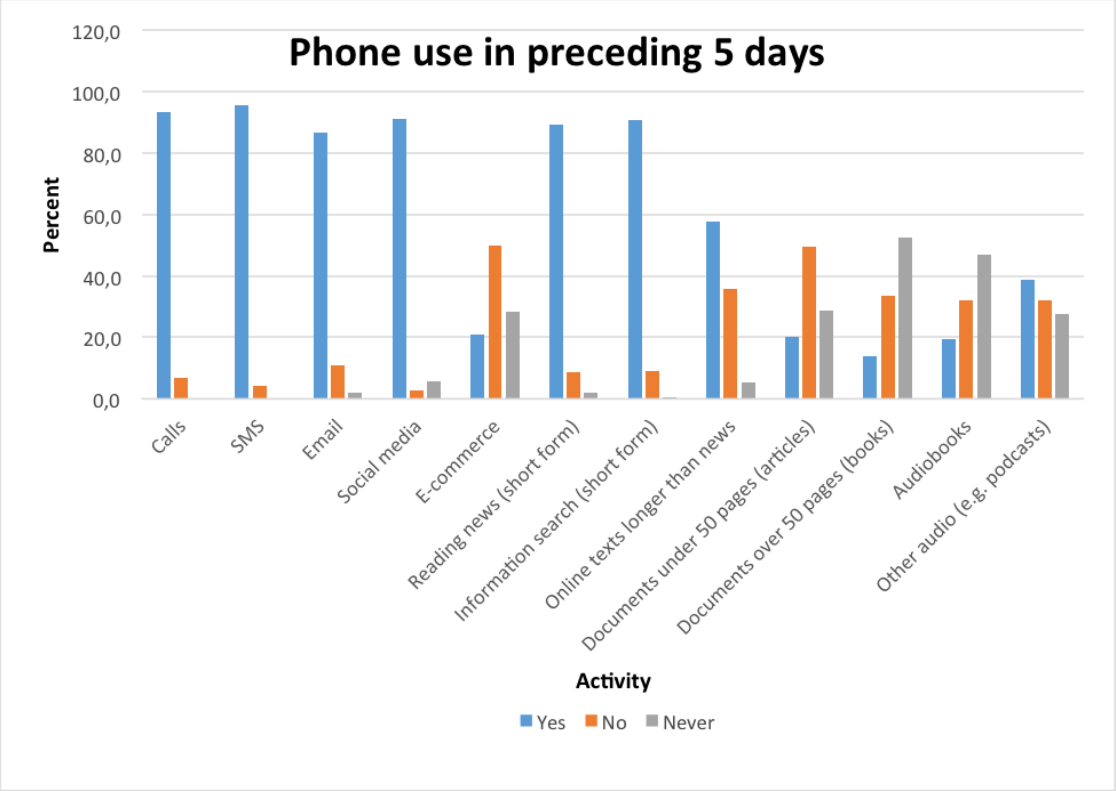
Results: genres, places, devices

Overall use of the smartphone

The survey was developed to give an overview of devices used for reading, but with a special focus on the use of smartphones. Figure 1 shows how all respondents (both male and female) use the smartphone for various activities including voice conversation, texting,

social media, e-commerce, reading of different text types, and listening. Communicative activities, in either text or voice, prevailed. However, 56% of our respondents reported reading online texts longer than a typical news article on the phone and 20% reported reading standalone documents under 50 pages, while 12.5% reported reading standalone documents longer than 50 pages.

Figure 1: Use of the smartphone in the preceding 5 days by percentage (male and female combined)



Reading habits related to gender

Respondents of both genders reported using the phone a lot, but overall the men in our sample seem to use it more frequently than the women (Appendix 2, Table 1). 51% of the male respondents and only 39% of the women reported using their phone at least once per hour. However, the women reported spending more time on the phone per occasion. On average, 37% of them reported using the phone for 3 minutes or more at a time, whereas the same was true for only 27% of the men, who otherwise reported using their phone in shorter sessions (**Appendix 2**, **Table 2**).

Furthermore, respondents of both genders reported using both print and digital devices for reading (**Appendix 2**, **Table 4**, Genres). As for preferred technologies in relation to *fiction* reading specifically, both genders reported predominantly using print, followed by the various digital devices. Among the digital devices, perhaps the most noteworthy statistically significant difference was that the tablet emerged, together with the phone, as the most popular digital device for women's fiction reading. Meanwhile, the male

respondents did not report regularly using tablets for fiction reading but showed, on the other hand, a stronger inclination towards full-size computers, a tendency that recurs throughout the data.

In relation to using the phone for listening to different types of content, we can identify further differences between genders (**Appendix 2**, **Table 3**). When asked about their use of the smartphone in the last 5 days, 23% of the women answered yes to audiobooks compared to just 5% of the men. By contrast, 55% of the men answered yes to listening to other formats than audiobooks (e.g. podcasts) whereas among the women the percentage was 35%.

Looking more closely at *where* our respondents read (**Appendix 1**, Items 18–30; **Appendix 2**, **Table 4**, Places), we identified a number of interesting trends. The survey contained questions regarding the following domestic and public spaces: bedroom, living room, bathroom, kitchen, green areas (e.g. parks), work/study place, cafes/restaurants, public transportation, other public places (e.g. waiting rooms), during meetings, in the car, while waiting in public, on vacations. Within the domestic category, we can identify significant differences in the *bedroom* where 63% of the women read print ('almost always' and 'always') compared to 40% of the men. By contrast, 11% of the men report to read on the computer in the bedroom compared to only 4% of the women. The pattern recurs in the *living room* where 54% of the women read print compared to 36% of the men. What we see is a slightly stronger affinity towards print among women and towards the computer as reading device among men. In the *kitchen,* another device is in focus. Here women read print (25%) more often than men (17%), and the tablet, which is used equally often by both genders in the other rooms, is used more by women (23%) than men (15%). Still the domestic space where we find the biggest differences between men and women is the *bathroom*. Here the preferred reading device for both genders is the smartphone, but whereas 46% of the male respondents answered 'almost always' or 'always' to using it in the bathroom, the percentage was only 25% among women.

Finally, we will look briefly at the part of the survey where we asked questions related to affordances, affect, and user experience in relation to handling the smartphone (**Appendix 1**, Item 31; **Appendix 2**, **Table 5**). Using rating scales going from 'very negative' (-4) to 'very positive' (+4), we asked how much different aspects of the phone (e.g., backlight, small screen, reflecting surface, notifications, anxiety in relation to dropping or losing the phone) were felt to influence one's reading. In relation to backlight and reflection, we see a slightly more negative attitude among women. The two aspects of phone-supported reading where we can see a more pronounced difference is the fear of breaking or losing the phone and the lack of pagination. Women seem to pay more attention to the phone as a precious object, something to be careful with. The aspect most negatively valued by women, and significantly more so compared to men, is the absence of pagination when reading on the phone.

Women and mobile reading

Female readers are of special interest since they are known to be the 'best readers in the world' (Kobo, 2016). Women over 45 are the most strongly represented demographic group among the most committed readers, i.e., those who read for at least 30 minutes every day. Our respondents were not average readers, however. Relative to the latest survey of reading in Denmark, the women in our sample read more. Surveys are often difficult to compare due to differences in question phrasing. This is the case here where the Danish national survey (Bak et al., 2012) asks how often people read books, whereas we asked how many books our respondents had read in the previous 12 months. Still only 1.4% of our female respondents answered zero books, whereas 13% of women in the latest national survey reported never to read books.

The 221 women in our sample were between 19 and 65 years of age, with a mean age of 39 years. 53 of them were students, with a mean age of 28 years (19-52 years, range = 33). Among the students, 49% had completed an undergraduate degree. 72% lived in a university city and 53% were married or living in a relationship. 77% reported not having parental responsibility for children under 15 years of age. In the remaining group of 168 women, who stated that their main occupation as work, the mean age was 44 years (25-65 years, range = 40). 99% of these women had a graduate or higher professional degree, 31% of them holding a 'kandidat', i.e., the Danish equivalent to master's degree. Only 37% lived in a university city and 75% were married or lived in a relationship. 67% had parental responsibilities for children under 15.

We divided our female respondents into five smaller age groups spanning a decade each (19-28, *N* = 50; 29-38, *N* = 60; 39-48, *N* = 55; 49-58, *N* = 34; 59-65, *N* = 22) and analysed data related to the use of different devices, as well as to genre and environment. We also analysed these groups' responses regarding affordances and user experience in relation to reading on the smartphone.

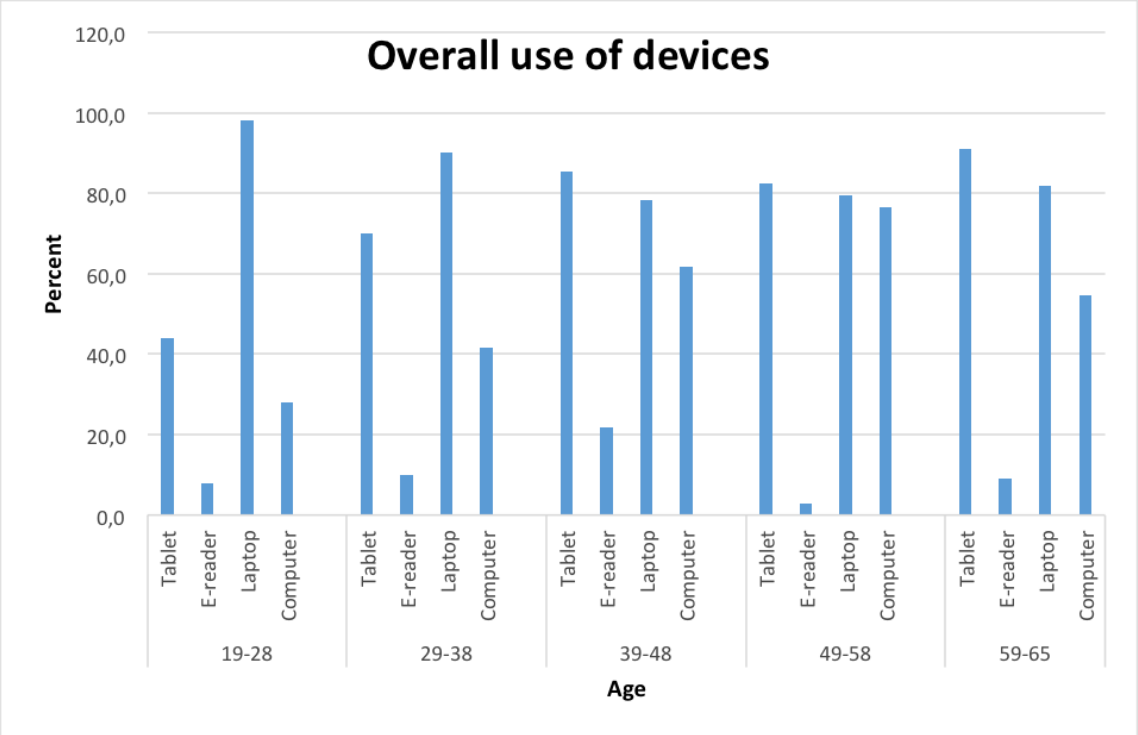
When looking at the different age groups' use of different devices (**Figure 2**), we see that other than the smartphone, which is used across the entire sample, the youngest age group primarily uses laptops whereas the other age groups show a greater variety in their use of devices. Especially women from 49 to 58 years show a broad and almost evenly distributed use of all devices (except dedicated e-readers).

Women and genre

As mentioned above we anticipated a reading behaviour where different devices were used for different genres. In addition, we hypothesized that younger women were more likely to read on their phone than older women. Tables 6 and 7 in **Appendix 2** show the preferred reading device in relation to genre. Specifically, we have chosen to focus on news, fiction, and expository non-fiction (excluding highly narrative non-fiction genres such as biographies). The data reveals a significant difference between the youngest and the oldest groups. If we focus on *news*, the youngest age group reads on their phone (70%)

supplemented with their computer (a category comprising *both* laptops and desktop computers in the relevant section of the survey; 50%), whereas the oldest group reads print newspapers (59%) supplemented with their tablet (50%). When it comes to *non-fiction,* the preferred device among the youngest is print (64%) and computer (40%). In contrast, the oldest age group read almost exclusively non-fiction in print (96%). The data on *fiction* reading shows a nearly identical affinity towards paper books among all groups (between 76% and 82%; but again 20% of the youngest respondents complement print with the phone) and the computer/laptop (12%) whereas all the older groups use the tablet (e.g. 39-48 year olds; 20%).

Figure 2: Women's overall use of different devices divided into age groups



When we look at the three middle groups (ages 29-58) we see a more blurred picture, which sometimes follows the general age curve, but at other times seems more diverse. In relation to the use of phones for *news* reading, we see that the 29-48-year olds seem to follow the behaviour of the youngest group, whereas the respondents over 48 seem less open to reading news on the phone. As for *non-fiction*, while women over 58 seem to exclusively rely on print, the three middle groups show a more varied choice of devices, but non-fiction reading on the computer/laptop seems only to be part of the youngest group's behaviour. When we look at tablets as reading devices in relation to *fiction* reading, the main distinction seems to be between respondents over and under 38; the younger do not use tablets for fiction reading while the over 38s do.

Reading in new places

The smartphone is characterized by mobility and omnipresence. The question is if these qualities generate new reading habits. To what extent do female smartphone users read in new places? In the following section, we focus on some of the environments where we assumed that the phone would most typically be used as a reading device.

As we can see from **Tables 8** and **9** in **Appendix 2**, our youngest respondents are the keenest smartphone readers. In all of the five places/situations selected (bedroom; green areas; public transportation; other places (e.g. waiting rooms); waiting in public), they are most likely to read on the phone. What is perhaps most interesting, however, is the way in which the other age groups behave in relation to different places. In terms of smartphone reading in the bedroom, our respondents fall into 3 distinct groups. 62% of the 19-28-year olds report to read on their smartphone in the bedroom. In the groups aged 29–38 and 39–48, smartphone reading in the bedroom was reported by 32% and 25%, respectively. Among respondents aged 49 and older this behaviour is virtually non-existent. If we instead look at smartphone reading in green areas such as parks, we see a more gradual decrease in percentage going from 58% among the youngest to 14% among the 58-65 years old. The same is the case in relation to reading in public transportation. In waiting situations outside the home the 19-28-year olds show the same patterns of behaviour as the 29-38-year olds.

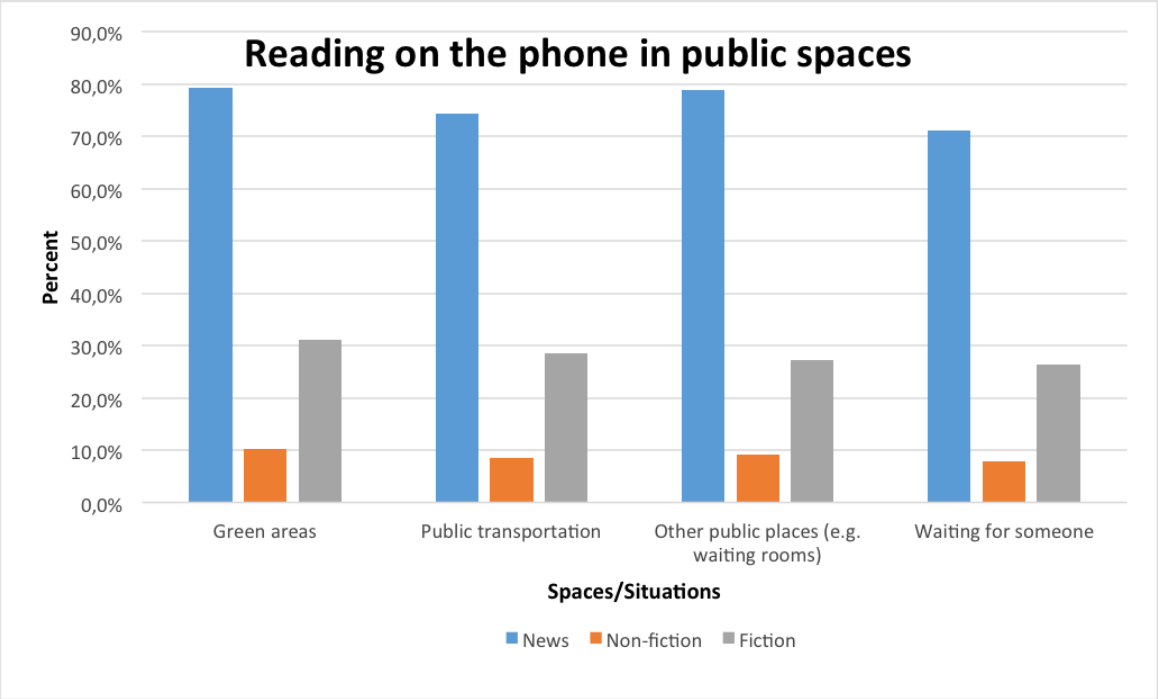
To further examine the nature of reading in new places, and based on the fact that the 19-28-year olds appear to be the most keen on reading on their phone when outside the home, we analysed the data from this youngest age group in terms of how different genres combine with various non-home places/situations. Again, we narrowed the choice of genres down to news, non-fiction and fiction. **Figure 3** below shows quite clearly that reading in these places for the most part concerns news reading.

Analysis

Reading habits related to gender

Mobile phone use seems to vary with gender both in terms of frequency and time spent per occasion. Also, gender-specific preferences with respect to the reading substrate for fiction reading occur. While female respondents tend to supplement phone use with tablets, male respondents rather supplement phone use with full-size computers. Moreover, the women in our sample listen more to audiobooks compared to the men. The men, on the other hand, spend more time listening to podcasts. This difference could indicate a more stereotypical behaviour where women seek out fiction narratives and men prefer podcasts, i.e., stories that despite a dramatized form belong to the non-fiction (documentary, journalism) genre (Tepper, 2000).

Figure 3. Women's reading on the phone in public spaces (19-28 years, *N* = 50)



The results also reveal gender differences in reading habits relative to reading location. Women read print more often than men in the bedroom, living room and kitchen. In the latter location, another gender difference emerges inasmuch as women tend to use tablets more. This is likely due to expository reading in relation to cooking, an activity women may spend more time on, compared to men. Gender also matters in relation to perceived affordances/user experience of the smartphone. Here, women report more fear of breaking or losing the phone. A possible explanation based on existing literature may be that women associate carrying a mobile phone with a sense of security in public places (Serrano-Puche, 2015).

The most pronounced between-gender difference in digital reading, statistically speaking, is the men's habit of extensive reading on their smartphone when they are in the bathroom. One explanation may be that the bathroom is often the only place in a home where you can lock the door, and that men use it as a hideaway more frequently than women. Finally, women reported being more frustrated by the absence of pagination when reading on the phone. We cannot explain this based on available literature. We can only infer that women are more concerned with structure and the overview of a text as provided by page numbers simply because they read more print books than men (Kobo, 2016; Eurostat 2016).

Effects of age, genre and location among female readers

We expected a robust inverse relationship between age and digital media use, i.e., digital media use decreasing with increasing age (The Danish Agency for Culture and Palaces, 2018b). Taken in aggregate, the data from our female participants does not confirm this

hypothesis. We also assumed that parental responsibilities and/or commuting would influence the digital reading habits, yet our data does not show any significant differences in relation to these variables either. Rather, our data shows that all ages read all genres and use all devices, with the exception of dedicated e-readers, which are rarely used, a rather surprising finding in a relatively affluent and highly digitally and generally literate sample such as ours. One explanation can be that Amazon is not established in Denmark yet. What our analysis shows, however, is a more nuanced picture related to age.

The youngest age group primarily uses laptops whereas the other age groups show a greater variety in their use of devices. Especially women from 49 to 58 years show a broad and almost evenly distributed use of all devices (except dedicated e-readers). Since almost all the women in the youngest group were students, their reading behaviour patterns also reflect differences in life and economic conditions. Students have limited economic means compared to professionals. For many of them, all they need and can afford is a laptop as work device for their studies, and a smartphone to keep them connected and updated on their social life and on what goes on in the world. A similar prominence of laptops in the reading patterns of university students has been found in other surveys (Burke and Bon, 2018). Professionals, on the other hand, have greater economic means. They work on desktop computers at their workplace and may possibly also have laptops provided by their employer. Our respondents' use of devices is thus obviously grounded in practicality and convenience alongside factors such as affinity or dissonance.

A similar effect of overall life conditions seems to emerge in relation to genre. The students read non-fiction on their laptop because non-fiction reading makes up a major part of their education and because the laptop is their primary work device. The same goes for their news reading on computers/laptops, which probably takes place in breaks at the university, where the laptop is already accessible for study purposes on the table in front on them. News reading among the older groups seems more likely to take place in the morning at the breakfast table with a printed newspaper. Most strikingly, print is still the dominating substrate for fiction reading among all women. Here we see almost no difference across the age groups. An explanation may be that many concentrate their fiction reading to vacations (Bak et al., 2012), and vacations are often associated with charter trips to sunny and near beach locations. The digital devices are sensitive to sand and water, and their screens can reflect sunlight to such a degree that reading is hampered. The practicality of the device, in this case the print book, wins. Still the tablet supplements fiction reading in print among the women in their forties, in convergence with previous findings concerning this age group's positive attitudes to tablets specifically (Magsamen-Conrad et al., 2015). Here we see a correlation between the use of tablets and reading in the living room.

Age-related preferences for genre and location also occur. Apparently, women under 39 have all grown similarly accustomed to using the smartphone in situations when they have some extra minutes to kill, whereas those who are 39 or older seem more likely to rest, read a print magazine or pay attention to their surroundings. It is also worth noting that very few of the respondents use their smartphones for reading non-fiction when on the

go, but some smartphone-supported fiction reading does take place. Similarly to previous studies (Burke and Bon, 2018), however, the relatively low percentage (25-30%) combined with the student sample size and structure of our data prevents us from confirming the hypothesis that the digitization of literature, reader-friendly screens and overall affinity for the phone bring an expansion of *fiction* reading into new places *via* smartphone-supported reading among the young. Rather, it seems that if smartphones are significantly helping the expansion of any particular genre into new places, it is the news genre.

Discussion: possibility, practicality, convenience

Studies of reading habits and media use often draw a stereotypical picture, especially when it comes to gender and age differences. Women are typically reported to read fiction while men are reported to read non-fiction (Tepper, 2000; Summers, 2013). Women reportedly prefer paper whereas men are more open to adopting new technologies (Cai, Fan, and Du, 2017). To some extent, we can see the same tendencies in our data, but not to the degree we anticipated. Instead, we observed quite a varied and complex picture of digital reading both across genders and across age groups. Overall the decisive factor when it comes to digital reading seems to be the device. Regardless of age, gender and occupation our respondents choose to read on the device closest at hand, meaning that the smartphone is often used because of its proximity and ubiquity. Furthermore, we can see that all of our respondents read all genres on all sorts of devices. This is an interesting result that can at least partly be explained with reference to our specific sample, consisting of university students and well-educated library professionals who have an inherent interest in different text formats and a relatively high income. However, we also found a number of differences within our sample. The women who took part in our survey have a slightly stronger affinity for print than the men. The men, on the other hand, seem to have a slightly stronger affinity to mobile phones and computers as reading devices. Nevertheless, these differences are quite small and do not constitute a basis for claims regarding gendered practices.

Of greater interest are the results from our analysis focusing on the female respondents. Here we see women who are positive towards digital devices. Contrary to common assumptions (Ahn and Jung, 2016), the older these women are, the more varied their range of devices. Technology is thus not rejected among our older respondents; they seem to be far from experiencing haptic dissonance (Gerlach and Buxmann, 2011). However, that does not mean that they reject print media. Most of them are quite loyal to print media, both in relation to news and in relation to fiction reading. Moreover, the women over 38 seem very fond of tablets. What we can infer is that their overall life conditions seem to be determining the reading habits and the number of devices used.

The youngest respondents (19-28) are mostly students. They need a laptop in order to follow courses and to work on assignments. They read non-fiction on the laptop, perhaps not necessarily because they like it, but because the course curriculum most typically is distributed in digital formats. Their lecturers thus define the preferred reading substrate of their studies. Additionally they read news on the phone because they probably access news

through social media (Reuters Institute, 2018, p.14) and cannot, or do not want to, spend money on a newspaper subscription. The youngest age group is also the group who reads most in new places. However, as the analysis shows, mobile reading is connected to the smartphone rather than tablet. Moreover, smartphone-supported reading on the go is mostly news reading. Mobility is here related to possibility and convenience; the smartphone is in the pocket and thus used for taking advantage of free time. Most of the 19–28 year olds' reading takes place on screens, except for fiction reading (see also Burke and Bon, 2018). Fiction reading for most people is part of their leisure time; it is voluntary and done for pleasure, often as an intended break from work/study and perhaps also from digital devices (Balling, 2017). In sum, the relatively unvaried reading behaviour of the 19-28-year olds seems to be grounded in convenience and in the economic and practical conditions of their everyday life.

The life conditions of the older age groups and particularly of the respondents over 38 years are much different from those of the students. They are more likely to be working and thus having a better economic foundation. They are more likely to be living with a partner and children, which means they live in a household where more devices can be shared. The family may have a desktop computer for gaming, a laptop to use in all the rooms in the house and a tablet, a device that is attractive for both young children and adults as it caters to a wide variety of activities (Danish Agency for Culture and Palaces, 2018a, p. 10, **Figure 4**). The popularity of the tablet among the oldest group can also be linked to the ageing body, e.g., as arthritis is a common disorder and the tablet weighs less than most print books, potentially causing less pain or visual impairment, where the affordance of the digital device can help enlarge the print size (Quan-Haase, Martin and Schreurs, 2014). Unfortunately, none of the user experience/affordance questions in our questionnaire (Appendix 1, Item 31) referred to the ability to customize text font size, a factor that would likely help further explain our findings regarding this group's extensive tablet use (Walker et al., 2016). In addition, a possible but unexplored motivation, as previously suggested in the literature (Magsamen-Conrad et al., 2015), is the socially grounded desire to be perceived as 'in style', and to prevent ageist perceptions of oneself as old-fashioned and aversive to change.

Thus our study suggests that material aspects of everyday life are significant for reading behaviour and media use among our respondents. It also shows what we can call the habit of convenience. People use the devices they have, and those that are at hand. Since they always carry their smartphones with them, it makes sense to read on them on the go and almost anywhere. However, other devices are used according to the practicality and affordance of the medium. For example, print books are used because it makes most sense when on vacation, tablets are used in the living room and the kitchen, but seldom on the move, and few would take a tablet with them to the beach as it reflects sunlight and is susceptible to damage from water and sand.

Conclusion

Overall, our survey documents a shift among the young away from print, albeit not in regards to fiction reading, and a shift among the older towards digital devices. The most robust differences emerge, perhaps unsurprisingly, between the youngest and the oldest group, whereas the middle groups (age 39-58) are characterized by the most complex and perhaps most fickle reading behaviour. Their members are quite loyal to print media, but also very interested in all other devices. They seem to represent a transition cohort who behave similarly to the youngest, e.g., in relation to the use of smartphones while waiting in public spaces, but are also heavy users of both print and tablets like their older peers. In a 2013 cross-generational intervention study focussing on tablet use, Magsamen-Conrad, et al. (2015) have likewise noted the specificity and complexity of this cohort's digital behaviours. Referred to as 'Generation X' (aged 33-49 in 2013), this cohort was reported by the authors as adopting the tablet based on a somewhat wider range of motivations than other demographic groups involved in the study, including so-called 'Generation Y' (aged 19–32 in 2013).

In relation to our findings, the main question is of course if this age group is in the rear-guard when it comes to print reading and part of the vanguard when it comes to mobile digital reading. In other words, is the diverse use of many different devices as seen among the women over 38 years, characteristic of those who have grown up with print and mass media, or will the women under 38 develop more diversified media habits, resembling those of their older peers, as their life conditions evolve? This is a question for future research that also has ramifications for more large-scale, or even representative, surveys. Future studies will likewise show to what extent the findings of our study are an artefact of its main limitation, that is, the specificity of our convenience sample. As a population defined by its links to the Danish library sector, our respondents may be considered particularly qualified readers open to multiple genres and reading substrates. Moreover, their professional needs and attitudes may also bias their preferences compared with the general population. Perhaps highly proficient readers in general have unusually well-formed opinions about particular text formats and devices, although we should also consider the possibility that, conversely, they excel in their ability to ignore any aberrations in the reading substrate.

Our hypotheses and research questions built on the assumption that the reading device makes a major difference to and changes the reading patterns known from print-only reading. Thus, we expected smartphone-supported reading to blur the usual stereotypes associated with reader groups and different reading places. Our first research question 'What do people read on smartphones vs. other devices and where do they do it?' was rather broad. We wanted to explore which genres our respondents read on their smartphones as compared to other devices including print, and in which environments and everyday situations they did so. Our main hypothesis in relation to this question was that smartphones overall would primarily be used for short-form genres. We could confirm this

hypothesis but also found what seems like an emerging pattern of smartphone-supported fiction reading on the go among the youngest respondents.

Our second research question concerned the socio-demographic characteristics of those who read most on their smartphones. Our main hypothesis here was that the use of smartphones but also other digital devices for reading would be inversely related to age. This hypothesis was not confirmed, albeit we positively found our youngest respondents to read less print than the other groups. Furthermore, we found only indirect (i.e. age-based) support for the additional hypothesis that parenting responsibilities would make readers more open to using their smartphones and/or other digital technologies for reading. The focal device in this respect, however, turned out to be the tablet rather than the smartphone. Moreover, the tablet emerged as highly popular for long-form reading among those who are long past parenting responsibilities.

Our third research question concerned fiction-reading patterns specifically, in relation to different devices and/or environments. We assumed these would be distinctive but did not have a specific hypothesis. While we found that fiction was indeed heavily associated with print, supplemented by smartphones (in younger readers) and tablets (in older readers), we did not find any striking patterns in relation to different environments.

On a more general level, we found relatively little support for the idea that readers' choices between specific devices are steered by the genre factor (e.g. Kobo, 2016). Rather, we found that in their overall habits readers match devices and genres in varied ways, depending on what devices they personally like (affinity) and what their instantaneous situation affords and allows (possibility, practicality, convenience). Thus in comparison to the old print-only ecologies, where many genres were associated with physically distinct artefacts (e.g. newspapers vs. bound volumes), genre seems indeed to have become a more elusive phenomenon (see also Schilhab et al., 2018). However, the manifold uses of genres and substrates unveiled by our survey indicate that readers are developing a flexible and highly personalized approach to reading as an activity, a direct consequence of digitization that has significant potential for furthering reading and its benefits among populations outside our specific sample.

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Appendix 1: Online questionnaire: *Are you a mobile reader?* (Translated from Danish)

1. Do you use your mobile phone for reading?

(a) My phone does not allow reading beyond SMS
(b) My phone allows reading (other than SMS) but I never read on it anyway
(c) I use my phone for reading (other than SMS)

[Only those who answer (c) are invited to take part in the survey.]

2. Do you always carry your phone when leaving your home?

(a) Yes
(b) No

3. How often do you use your phone on a normal day?

(a) At least once an hour during the daytime
(b) Once every two hours during the daytime
(c) Several (3+) hours can pass without me using my phone

4. How much time do you spend using your phone on a normal day altogether?
(a) Less than one hour altogether
(b) More than one hour

5. On average, how much time do you spend using your phone per occasion?
(a) Less than 15 seconds
(b) Between 15 seconds and 1 minute
(c) Between 1 and 3 minutes
(d) Three minutes or more

6. In the past 5 days, did you use your phone for the following activities?

	Yes	No, not in the past 5 days	No, never	I don't remember
Calls	(a)	(b)	(c)	(d)
SMS	(a)	(b)	(c)	(d)
Email	(a)	(b)	(c)	(d)
Social media	(a)	(b)	(c)	(d)
Online shopping	(a)	(b)	(c)	(d)
Reading brief news articles	(a)	(b)	(c)	(d)
Looking up brief information beyond news and shopping (book search, timetables, weather, etc.)	(a)	(b)	(c)	(d)
Reading continuous online texts that are longer than a typical news article (e.g. health and medical sites)	(a)	(b)	(c)	(d)
Reading continuous texts in standalone documents that are shorter than 50 pages (reports, articles, etc.)	(a)	(b)	(c)	(d)
Reading continuous texts in standalone documents that are longer than 50 pages (reports, articles, etc.)	(a)	(b)	(c)	(d)
Listening to audiobooks	(a)	(b)	(c)	(d)
Listening to other contents than audiobooks (e.g. podcasts)	(a)	(b)	(c)	(d)

7. Do you use a tablet?
(a) Yes
(b) No

8. Do you use a dedicated e-reader?
(a) Yes
(b) No

9. Do you use a laptop computer?
(a) Yes
(b) No

10. Do you use a desktop computer?
(a) Yes
(b) No

11. How often do you use the following technologies for reading news?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

12. How often do you use the following technologies for reading longer journalistic texts (features, essays, in-depth interviews, etc.)?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

13. How often do you use the following technologies for reading reference articles (academic or popular)?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)

Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

14. How often do you use the following technologies for reading academic reference books?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

15. How often do you use the following technologies for reading narrative non-fiction (travel reports, biographies)?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

16. How often do you use the following technologies for reading fiction?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

17. How often do you use the following technologies for reading brief informational texts (recipes, life style, encyclopedia entries/instant knowledge)?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

18. How often do you use the following technologies for reading in your bedroom?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

19. How often do you use the following technologies for reading in the living room?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

20. How often do you use the following technologies for reading in the bathroom?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)

Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

21. How often do you use the following technologies for reading in the kitchen?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

22. How often do you use the following technologies for reading in green areas such as parks, gardens, nature reserves etc.?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

23. How often do you use the following technologies for reading in your main place of work/study outside home?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

24. How often do you use the following technologies for reading in coffee shops, restaurants, and similar venues?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

25. How often do you use the following technologies for reading in public transportation?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

26. How often do you use the following technologies for reading in other public spaces such as waiting rooms, sports facilities, theatres, etc.?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

27. How often do you use the following technologies for reading during meetings and gatherings?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)

Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

28. How often do you use the following technologies for reading in the car?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

29. How often do you use the following technologies for reading while waiting for someone/something outside your home?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

30. How often do you use the following technologies for reading when you are on holiday?

	Never	Seldom	Often	Almost always	Always
Print media	(a)	(b)	(c)	(d)	(e)
Mobile phone	(a)	(b)	(c)	(d)	(e)
Dedicated e-reader	(a)	(b)	(c)	(d)	(e)
Tablet	(a)	(b)	(c)	(d)	(e)
Computer	(a)	(b)	(c)	(d)	(e)

31. Imagine using your phone to read a longer continuous text corresponding to approx. 5 printed pages. Please provide a rating for how your reading experience is likely to be affected by the following factors, referring to '-4' for highly negative effect, '0' for no effect whatsoever, and '4' for highly positive effect.

	-4	-3	-2	-1	0	1	2	3	4
The display of the phone is backlit	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone is wherever I go	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone can be manipulated with just one hand	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Things happening in my immediate surroundings (noise, rain, etc.)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The other functionalities of my phone (beeps and ringing, social media alerts, game updates, etc.)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Other people who may be present in my immediate surroundings	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
My reading could be interrupted	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone is connected to the internet	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone gives immediate access to a wealth of different texts	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The glare of the screen	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone may get lost or damaged	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The weight of the phone	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The screen is relatively small	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Others cannot see what I am reading	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
The phone is an item of personal value to me	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
I cannot get an overview of the text as a whole	(a)	(b)	(c)	(d)	(d)	(e)	(g)	(h)	(i)
The phone battery can run out	(a)	(b)	(c)	(d)	(d)	(e)	(g)	(h)	(i)
There are no page numbers	(a)	(b)	(c)	(d)	(d)	(e)	(g)	(h)	(i)

32. Do you use an e-reading app on your phone (e.g. Kindle) to synchronise your reading with other devices such as tablet or dedicated e-reader?
(a) Yes
(b) No

33. Do you use an e-reading app on your phone (e.g. Amazon Whispersync) for switching between reading and listening to the same book?
(a) Yes
(b) No

34. Do you ever listen to an audiobook in order to complement your reading of the same text, so that you listen when you are on the go (in the car, on the bike, bus etc.) and then continue with the written text when you get home?
(a) Yes - in combination with a printed book
(b) Yes - in combination with an e-book
(c) No

35. Over the past 12 months, how many e-books have you read on your phone (in part or in full)?

36. Over the past 12 months, how many e-books have you read and finished on any digital device (mobile phone, tablet, desktop/laptop computer, dedicated e-reader)?

37. Over the past 12 months, how many print (physical) books have you read and finished?

38. What is your main occupation at the moment?
(a) Studies
(b) Work

39. How many years of your life have you spent working thus far?

40. What is the highest level of education that you have completed?
(a) Secondary school
(b) Post-secondary vocational training
(c) Bachelor's degree at a university
(d) Master's degree at a university
(e) Ph.D.

41. Where do you live?
(a) In a rural area
(b) In a town
(c) In a university city

42. What is your civil status?
(a) Married/common-law marriage
(b) Single

43. Are you a parent or have you ever cared for minors?
(a) Yes
(b) No

44. How many preschool-aged children do you currently care for?

45. How many primary school-aged children do you currently care for?

46. How many secondary school-aged children do you currently care for?

47. On a normal day, how much time do you spend on public transportation? Please indicate in minutes

48. How old are you?

49. What is your gender?
(a) Male
(b) Female
(c) Do not wish to disclose

50. If you can, please indicate the make and model of the device that you use as your primary mobile phone.

Appendix 2: Tables

Table 1: How often do you use your phone (%)

Female			**Male**			**Z**	**r***	**U**	**p****
Once an hour	*Every two hours*	*Less than3 hours*	*Once an hour*	*Every two hours*	*Less than3 hours*				
39	30	31	51	34	15	-2,257	0,13*	4957	0,024**

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**Significance level was set to p<.05

Table 2: How long do you use your phone (%)

Female				**Male**				**Z**	**r***	**U**	**p****
< 15 sec	*15 sec - 1min*	*< 3 min*	*> 3 min*	*< 15 sec*	*15 sec - 1min*	*< 3 min*	*> 3 min*				
1	17	46	37	2	29	42	27	-2,097	0,12	5048	0,036

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**Significance level was set to p<.05

Table 3: How often do you listen to the following (%)

	Female			Male			Z	r*	U	p**
	Yes	No	Never	Yes	No	Never				
Audiobooks	23	31	44	5	36	58	-2,245	-0,13	4976	0,025
Podcasts	35	35	28	55	22	23	-2,267	-0,14	4946	0,023

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**Significance level was set to p<.05

Table 4: Significant differences in the use of device while reading - genres and places (%)

Question	Male					Female					Z	r*	U	p**
	Never	Seldom	Often	Almost always	Always	Never	Seldom	Often	Almost always	Always				
Genres														
Read news on computer	2	9	42	29	18	3	27	43	19	8	-3,512	-0,21	4312	0.000
Read narrative non-fiction on tablet	65	20	13	0	2	49	32	11	2	5	-2	-0,12	5114	0,45
Read fiction in print	4	7	18	49	22	2	5	14	41	38	-2,105	-0,13	5032	0,35
Read fiction on tablet	69	16	14	0	0	52	26	10	2	10	-2,371	-0,14	4944	0,018
Read other on tablet	36	13	33	11	7	26	9	28	8	28	-2,745	-0,16	4670	0,006
Places														
Reading print - bedroom	18	18	24	20	20	10	9	19	33	30	-2,885	-0,17	4596	0,004
Reading on PC - bedroom	69	11	9	5	6	80	13	3	2	2	-2,017	-0,12	5303	0,44
Reading print - living room	4	16	44	16	20	3	12	32	21	33	-2,217	-0,13	4949	0,027
Reading on PC - living room	27	13	24	9	27	36	28	20	6	9	-3,114	-0,19	4485	0,002
Reading on phone - bathroom	14	20	20	22	24	36	23	16	13	12	-3,655	-0,22	4194	0
Reading print - kitchen	24	36	24	6	11	18	25	33	8	17	-2,025	-0,12	5038	0,43
Reading on tablet - kitchen	55	14	16	4	11	37	15	26	4	19	-2,462	-0,15	4831	0,014
Reading print - green areas	18	27	29	13	13	11	19	28	18	24	-2,58	-0,16	4744	0,01
Reading on tablet - green areas	84	11	4	0	2	65	18	8	2	7	-2,731	-0,16	4894	0,006

Reading on phone while at work	4	33	44	11	9	18	35	28	7	11	-2,223	-0,13	4946	0,026
Reading on tablet when on holiday	67	13	13	2	5	51	19	16	4	10	-2,127	-0,13	5051	0,033

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect

**Significance level was set to p<.05

Table 5: Gender differences in affordances (%)

	Male	Female	Z	r*	U	p**
Backlight			-2,221	-0,13	4934	0,026
1 very negative	2	4				
2	0	9				
3	16	19				
4	18	16				
5	36	35				
6	0	0				
7	9	1				
8	5	7				
9	6	4				
10 very positive	7	4				
Internet connection			-2,305	-0,14	4881	0,021
1 very negative	5	13				
2	14	9				
3	5	19				
4	11	14				
5	40	29				
6	0	0				
7	4	1				
8	5	7				
9	4	3				
10 very positive	11	5				
Reflecting surface			-2,0601	-0,12	5024	0,039
1 very negative	7	9				
2	2	13				
3	11	19				
4	27	15				
5	44	37				
6	0	0				
7	4	2				
8	4	2				
9	0	2				
10 very positive	2	0				
Fear of breaking/losing phone			-2,945	-0,18	4731	0,003

1 very negative	0	5				
2	2	4				
3	7	9				
4	7	18				
5	74	60				
6	0	0				
7	4	2				
8	2	0				
9	0	1				
10 very positive	4	0				
Pagination			-2,923	-0,18	4597	0,003
1 very negative	4	15				
2	7	13				
3	14	14				
4	15	14				
5	51	40				
6	0	0				
7	4	1				
8	2	1				
9	0	1				
10 very positive	4	0				

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**Significance level was set to p<.05

Table 6: Significant differences between age groups, only females – genres (%)

News			**19-28**	**29-38**	**39-48**	**49-58**	**58-65**	**Sign***
		Never	78	67	49	23	14	χ^2 (4, n=221)=55,24 p=,000
	Print	Often	20	27	46	53	27	
		Always	2	7	6	23	59	
		Never	6	10	15	12	36	χ^2 (4, n=221)=33,61 p=,000
	Phone	Often	24	25	29	65	50	
		Always	70	65	56	23	14	
		Never	100	98	98	97	96	
	E-reader	Often	0	2	2	0	0	
		Always	0	0	0	3	4	
		Never	70	47	35	38	18	χ^2 (4, n=221)=21,55 p=,000
	Tablet	Often	16	27	33	44	32	
		Always	14	27	33	18	50	
		Never	18	28	27	38	59	χ^2 (4, n=221)=24,65 p=,000
	Computer	Often	32	50	44	44	41	

		Always	50	22	29	18	0	
Non-fiction		Never	16	8	7	6	0	
	Print	Often	20	25	20	18	4	
		Always	64	67	73	76	96	
		Never	88	93	93	91	100	
	Phone	Often	6	3	5	6	0	
		Always	6	3	2	3	0	
		Never	98	100	94	94	100	
	E-reader	Often	2	0	4	3	0	
		Always	0	0	2	3	0	
		Never	80	82	84	88	86	
	Tablet	Often	8	12	9	0	14	
		Always	12	7	7	12	0	
		Never	32	77	74	82	96	χ^2 (4, n=221)=48,22 p=,000
	Computer	Often	28	17	16	9	4	
		Always	40	7	9	9	0	
Fiction		Never	10	7	9	3	4	
	Print	Often	14	12	14	21	14	
		Always	76	82	76	76	82	
		Never	70	80	69	77	86	
	Phone	Often	10	12	16	18	14	
		Always	20	8	14	6	0	
		Never	96	92	80	97	96	
	E-reader	Often	2	3	11	3	0	
		Always	2	5	9	0	4	
		Never	86	82	71	74	73	
	Tablet	Often	8	7	9	15	23	
		Always	6	12	20	12	4	
		Never	80	95	96	100	100	χ^2 (4, n=221)=19,39 p=,001
	Computer	Often	8	3	4	0	0	
		Always	12	2	0	0	0	

*significant level was set to p<.05

Table 7: Mann-Whitney-U test between female age groups – genres

	Group	**Device**	**Z**	**N total**	**r***	**U**	**p****
News	***Gr1 vs. Gr3	Print	-3,036	105	-0,30	975	0,002
		Tablet	-3,485	105	-0,34	878	0,000
	Gr1 vs. Gr4	Print	-5,076	84	-0,55	365	0,000

		Phone	-3,935	84	-0,43	464	0,000
		Computer	-3,023	84	-0,33	538	0,000
	Gr1 vs. Gr5	Print	-5,746	72	-0,68	134	0,000
		Phone	-4,619	72	-0,54	208	0,000
		Tablet	-4,119	72	-0,49	245	0,000
		Computer	-4,391	72	-0,52	211	0,000
	Gr2 vs. Gr4	Print	-4,073	94	-0,42	552	0,000
		Phone	-3,378	94	-0,35	633	0,001
	Gr2 vs. Gr5	Print	-5,085	82	-0,56	218	0,000
		Phone	-4,207	82	-0,46	294	0,000
		Computer	-2,987	82	-0,33	398	0,003
	Gr3 vs. Gr4	Print	-2,901	89	-0,31	623	0,004
	Gr3 vs. Gr5	Print	-4,457	77	-0,51	237	0,000
		Phone	-3,382	77	-0,39	326	0,001
		Computer	-3,208	77	-0,37	340	0,001
Non-fiction	Gr1 vs. Gr2	Computer	-4,979	110	-0,47	758	0,000
	Gr1 vs. Gr3	Computer	-4,546	105	-0,44	735	0,000
	Gr1 vs. Gr4	Computer	-4,378	84	-0,48	413	0,000
	Gr1 vs. Gr5	Print	-2,802	72	-0,33	373	0,005
	Gr1 vs. Gr5	Computer	-4,806	72	-0,57	191	0,000

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**A Bonferroni correction was used, due to the number of groups: p=0.05/10=.005
***Gr1 = 19-28; Gr2=29-38; Gr3=39-48; Gr4=49-58; Gr5=59-65 years

Table 8: Reading on the phone in different places: significant differences between age groups, only females (%)

		19-28	**29-38**	**39-48**	**49-58**	**58-65**	**Sign***
Bedroom	Never	16	38	55	62	68	χ^2 (4, n=221)=41,44 p=,000
	Often	22	30	20	35	23	
	Always	62	32	25	3	9	
Green areas	Never	14	20	24	35	64	χ^2 (4, n=221)=29,48 p=,000
	Often	28	38	36	53	23	
	Always	58	42	40	12	14	
Public transportation	Never	6	17	27	29	36	χ^2 (4, n=221)=22,51 p=,000
	Often	24	37	34	44	32	
	Always	70	47	38	26	32	

Other public places (e.g. waiting room)	Never	12	10	13	21	32	χ^2 (4, n=221)=18,63 p=,000
	Often	22	32	40	53	41	
	Always	66	58	47	26	27	
While waiting in public	Never	8	5	13	24	32	χ^2 (4, n=221)=25,32 p=,000
	Often	16	25	36	47	23	
	Always	76	70	51	29	45	

*Significance level was set to p<.05

Table 9: Mann-Whitney-U between female age groups: reading on the phone in different places

	Group	Z	N total	r*	U	p**
Bedroom	***Gr 1 vs. Gr 2	-3,298	110	-0,31	990	0,001
	Gr 1 vs. Gr 3	-4,302	105	-0,42	751	0,000
	Gr 1 vs. Gr 4	-5,522	84	-0,58	280	0,000
	Gr 1 vs. Gr 5	-4,659	72	-0,55	196	0,000
	Gr 2 vs. Gr 4	-2,927	94	-0,30	676	0,003
Green areas	Gr 1 vs. Gr 4	-4,039	84	-0,44	436	0,000
	Gr 1 vs. Gr 5	-4,255	72	-0,50	225	0,000
	Gr 2 vs. Gr 4	-2,824	94	-0,29	685	0,005
	Gr 2 vs. Gr 5	-3,508	82	-0,39	344	0,000
	Gr 3 vs. Gr 5	-3,194	77	-0,36	338	0,001
Public transportation	Gr 1 vs. Gr 3	-3,541	105	-0,35	1145	0,000
	Gr 1 vs. Gr 4	-4,102	84	-0,45	442	0,000
	Gr 1 vs. Gr 5	-3,426	72	-0,40	302	0,001
Other public places (e.g. waiting room)	Gr 1 vs. Gr 4	-3,205	84	-0,35	529	0,001
	Gr 1 vs. Gr 5	-3,042	72	-0,36	325	0,002
	Gr 2 vs. Gr 4	-2,908	94	-0,30	682	0,004
	Gr 2 vs. Gr 5	-2,806	82	-0,31	415	0,005
While waiting in public	Gr 1 vs. Gr 4	-4,067	84	-0,44	454	0,000
	Gr 2 vs. Gr 4	-3,976	94	-0,41	570	0,000

*Effect Size using Cohen (1988) criteria, where .1 = small effect, .3 = medium effect, .5 = large effect
**A Bonferroni correction was used, due to the number of groups: p=0.05/10=.005